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Dartmouth Center for
**IMPLEMENTATION
SCIENCE**

Five Considerations for Formulating an Implementation Science Research Question

Hosted by:



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Dartmouth Center for Implementation Science

Plan for Today

- Brief overview of implementation science
- Key considerations for research questions
- Recommended fundamental readings
- DCIS resources

Motivation: Research-to-Practice Gap

- Gaps between research and practice happen in every healthcare and public health setting
- It is frequently cited that it takes an average of 17 years for evidence to change practice
- Implementation science seeks to narrow this gap
- How fast this gap can be narrowed is an empirical question

Suggested reading: Proctor, E., Ramsey, A.T., Saldana, L. *et al.* FAST: A Framework to Assess Speed of Translation of Health Innovations to Practice and Policy. *Glob Implement Res Appl* 2, 107-119 (2022). <https://doi.org/10.1007/s43477-022-00045-4>

Definition of Implementation Science

Implementation science is the study of methods to promote the adoption and integration of evidence-based practices, interventions, and policies into routine health care and public health settings to improve our impact on population health

Adapted from: Eccles, M.P., Mittman, B.S. Welcome to *Implementation Science* . *Implementation Sci* 1, 1 (2006).
<https://doi.org/10.1186/1748-5908-1-1>

Focus of Implementation Science

CONTEXTUAL FACTORS



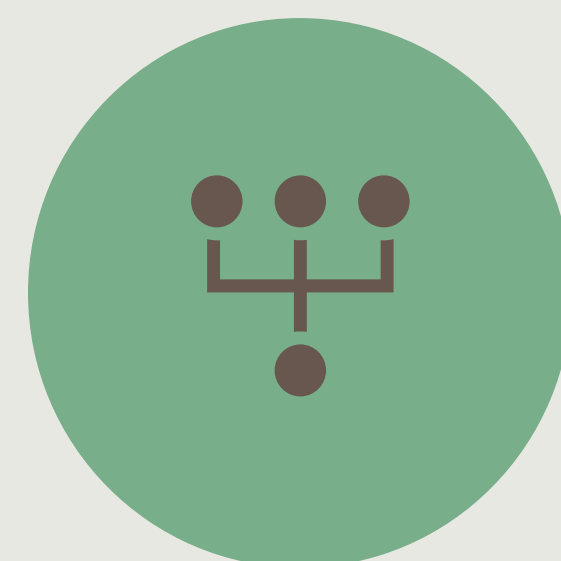
**IDENTIFY BARRIERS
AND FACILITATORS TO
IMPLEMENTATION WITH
A FOCUS ON CONTEXT**

IMPLEMENTATION & SUSTAINMENT



**DEVELOP AND TEST
STRATEGIES TO ADDRESS
BARRIERS AND ENGAGE
MECHANISMS TO
IMPLEMENTATION**

DE-IMPLEMENTATION



**REDUCE OR ELIMINATE
WHAT IS INEFFECTIVE
OR POTENTIALLY
HARMFUL**

What Makes it a Science?



Implementation science has an explicit goal of developing generalizable knowledge that can be applied widely beyond the individual system and setting under study

What methods work best to translate evidence into real world practice?

PAST EVENT

16th Annual Conference on the Science of Dissemination and Implementation in Health

Raising Expectations for D&I Science: Challenges and Opportunities



DATE & TIME
December 10-13, 2023

LOCATION
Crystal Gateway Marriott |
Arlington, VA

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IS Implementation Science

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Featured Editorial: Evidence for objects of implementation in healthcare

The Editors-in-Chief of *Implementation Science* and *Implementation Science Communications* reflect on what is meant by implementation of **evidence-based** practices, programmes, or policies in healthcare in the context of the journals' aims and scope.

[Read More](#)


Featured Editorial: a refreshed description of the journals' scope and expectations

This editorial describes the mission, scope, and expectations of *Implementation Science* and *Implementation Science Communications* and highlights some differences between the journals. We intend to support authors in their consideration on whether to submit to the journals, and hope we will continue to receive many high-quality submissions in the coming years.

[Read More](#)

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Five Considerations for Formulating an Implementation Research Question

Pursue questions that:

1. Remain unanswered
2. Are priorities for partners and communities
3. Start with the end in mind → what needs to be done
4. Are guided by a conceptual or theoretical framework
5. Advance knowledge of implementation

Suggested reading: Proctor, E.K., Powell, B.J., Baumann, A.A. *et al.* Writing implementation research grant proposals: ten key ingredients. *Implementation Sci* 7, 96 (2012). <https://pubmed.ncbi.nlm.nih.gov/23062065/>

1. Pursue questions that remain unanswered

Is there a foundation of prior work to build upon?

- Conduct a literature search
 - Barriers and facilitators; strategies; settings; populations
- Search PubMed and implementation science journals:
 - Implementation Science
 - Implementation Science Communications
 - Implementation Research and Practice
- Search for funded projects in NIH Reporter: <https://reporter.nih.gov>
- Talk with colleagues and experts in the field familiar with the topic

1. What are barriers and facilitators to adoption of lung cancer screening?

[Review](#) > [Lung Cancer](#). 2022 Oct;172:9-18. doi: 10.1016/j.lungcan.2022.07.022.

Epub 2022 Aug 2.

Barriers and facilitators to uptake of lung cancer screening: A mixed methods systematic review

Yu-An Lin ¹, Yu Ting Hong ¹, Xiu Jing Lin ¹, Jia Ling Lin ¹, Hui Min Xiao ¹, Fei Fei Huang ²

Affiliations + expand

PMID: 35963208 DOI: [10.1016/j.lungcan.2022.07.022](https://doi.org/10.1016/j.lungcan.2022.07.022)

> [Semin Oncol](#). 2022 Jul 25:S0093-7754(22)00058-6. doi: 10.1053/j.seminoncol.2022.07.004.

Online ahead of print.

Barriers and facilitators to lung cancer screening and follow-up

Ethan Bernstein ¹, Brett C Bade ², Kathleen M Akgün ², Michal G Rose ³, Hilary C Cain ⁴

Affiliations + expand

PMID: 35927099 DOI: [10.1053/j.seminoncol.2022.07.004](https://doi.org/10.1053/j.seminoncol.2022.07.004)

> [J Natl Cancer Inst](#). 2022 Nov 14;114(11):1449-1467. doi: 10.1093/jnci/djac154.

Facilitators and Barriers to Implementation of Lung Cancer Screening: A Framework-Driven Systematic Review

Ami E Sedani ¹, Olivia C Davis ², Shari C Clifton ³, Janis E Campbell ¹, Ann F Chou ⁴

Affiliations + expand

PMID: 35993616 PMCID: [PMC9664175](https://pubmed.ncbi.nlm.nih.gov/35993616/) DOI: [10.1093/jnci/djac154](https://doi.org/10.1093/jnci/djac154)

[Free PMC article](#)

Questions to guide next steps:

- Have studies been done in your context (e.g., rural)?
- Have studies been theoretically guided and modifiable targets identified?
- Do we know enough about barriers and facilitators to move on to studying strategies to implement lung cancer screening?

2. Pursue questions that address partner (*stakeholder) and community priorities

Rycroft-Malone and colleagues (2013) argue valuing implementation as a collaborative act that leads to:

- Knowledge and evidence that is more implementable
- Infrastructure that brings research evidence and implementation closer together
- Attention to local needs and increased relevance and impact of implementation activity
- Enhanced capacity and capability of implementation

Suggested reading: Rycroft-Malone, J., Wilkinson, J., Burton, C. R., Harvey, G., McCormack, B., Graham, I., and Staniszewska, S. (2013). Collaborative action around implementation in collaborations for leadership in applied health research and care: Towards a programme theory. *Journal of Health Services Research & Policy*, 18, 3 (supplementary): 13-26. <https://pubmed.ncbi.nlm.nih.gov/24127357/>

2. Prioritizing partner and community member priorities



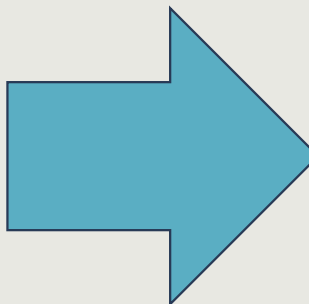
Suggested reading: Rubin R. It Takes an Average of 17 Years for Evidence to Change Practice—the Burgeoning Field of Implementation Science Seeks to Speed Things Up. *JAMA*. 2023;329(16):1333–1336. doi:10.1001/jama.2023.4387. <https://pubmed.ncbi.nlm.nih.gov/37018006/>

2. Prioritizing partner and community member priorities

- **Think about different perspectives at multiple levels:**
 - Deciders
 - Deliverers
 - Recipients
 - Families and communities
- **Methods:**
 - Informal meetings with multi-level partners and community members
 - Inner setting (e.g., healthcare setting, school)
 - Outer setting (e.g., policymakers, advocacy organizations)
- **Consensus discussions**
- **User- or human-centered design**
- **Participatory co-design**

3. Pursue questions with the end (i.e., proximal and distal outcomes) in mind

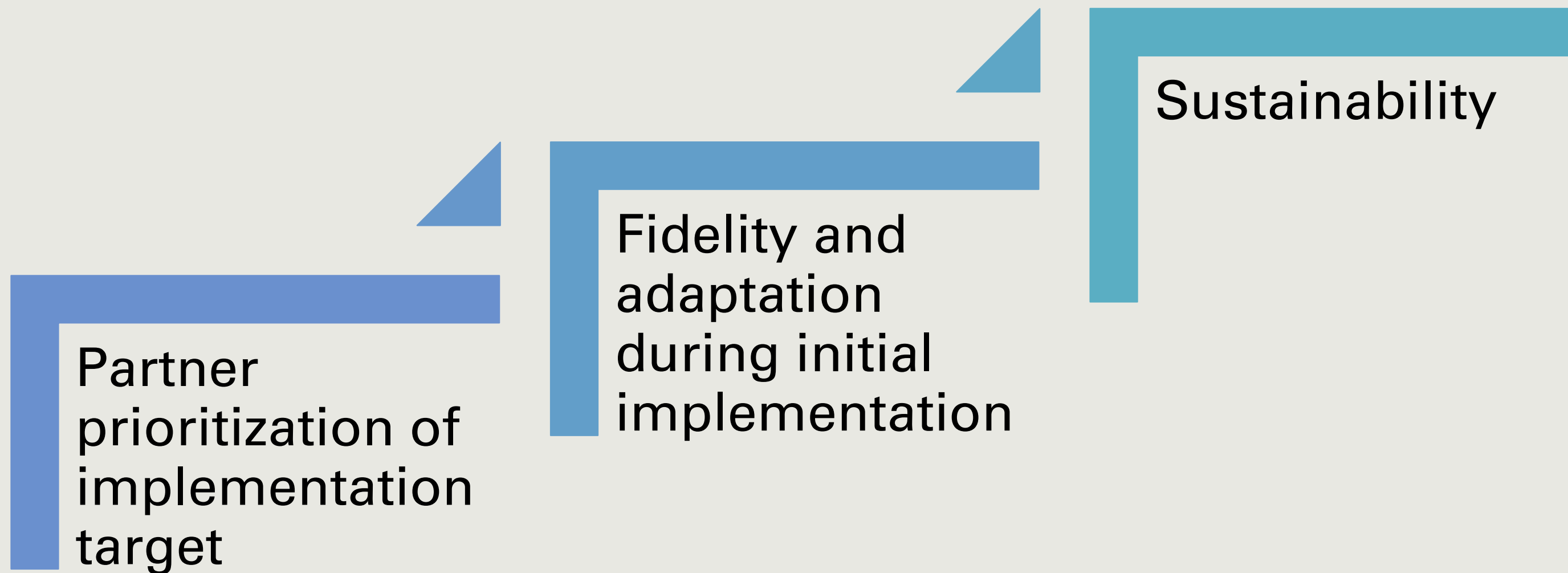
Implementation Outcomes (Proctor and colleagues 2011)



Acceptability	Stakeholders' perceptions that an implementation target is agreeable or satisfactory
Adoption (uptake)	Intent, initial decision, or action to use an implementation target
Appropriateness	Perceived fit, relevance, or compatibility of an implementation target for a given context or its perceived fit for a problem
Feasibility	Extent to which an implementation target can be successfully used within a given setting
Fidelity	Degree to which an intervention was implemented as prescribed or intended
Cost	Financial impact of an implementation effort
Penetration	Integration or saturation of an intervention within a service setting and its subsystem—calculated as a ratio of those to whom the intervention is delivered divided by the number of eligible or potential recipients
Sustainability	Extent to which an implementation target is maintained within a service setting

Suggested reading: Proctor E, Silmere H, Raghavan R, Hovmand P, Aarons G, Bunger A, Griffey R, Hensley M. Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. *Adm Policy Ment Health.* 2011 Mar;38(2):65-76. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3068522/>

3. Pursue questions with the end in mind



4. Pursue questions that are grounded in a conceptual or theoretical framework

	Determinant Frameworks	Process Models	Evaluation Frameworks
Purpose	Understanding and/or explaining what influences implementation outcomes	Describing and/or guiding the process of translating research into practice	Evaluating implementation process and outcomes
Example questions	<ul style="list-style-type: none"> What are barriers and facilitators to implementation? 	<ul style="list-style-type: none"> What are the reasons for unplanned adaptations to an evidence-based intervention during implementation? 	<ul style="list-style-type: none"> What is the extent to which the intervention reaches the target group during implementation?
Framework	<ul style="list-style-type: none"> Consolidated Framework for Implementation Research (CFIR) 	<ul style="list-style-type: none"> Framework for Reporting Adaptations and Modifications (FRAME) 	<ul style="list-style-type: none"> Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) Framework

Interactive webtool for selecting implementation TMFs: <https://dissemination-implementation.org/about-us/>

4. EPIS Process Model

Exploration

What evidence-based practices might address or solve clinical or health service problems

- Needs assessment to understand why people are not delivering the practice (e.g., barriers)

Preparation

Plan for integrating the evidence-based practice into the system

- What implementation strategies are desirable and feasible?

Implementation

Adopted practice is implemented

- Study strategies, mechanisms and implementation outcome

Sustainment

Evidence-based practice continues to be delivered with fidelity with continued health benefits

- Factors that predict and/or support sustainment

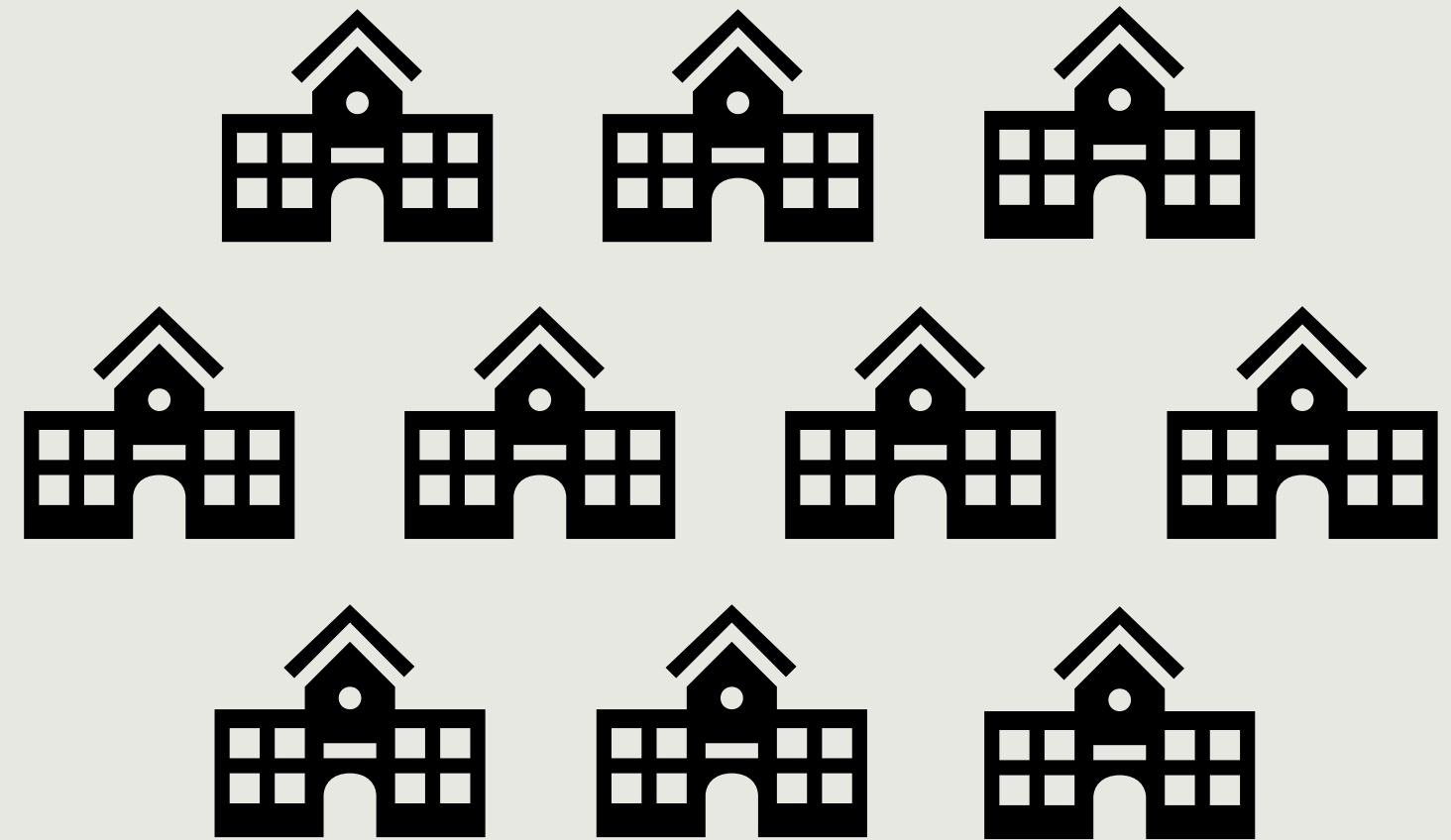
EPIS Framework website: <https://episframework.com>

For more on implementation strategies: Powell, B.J., *et al.* A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project. *Implementation Sci* 2015 Feb 12:10:21. doi: 10.1186/s13012-015-0209-1. <https://pubmed.ncbi.nlm.nih.gov/25889199/>

5. Pursue questions that will advance knowledge of implementation



“Implementation science both emphasizes the primacy of context but also seeks — as a scientific endeavor — generalizable or transferable insights and inferences that apply or inform across those settings.”



Source: <https://www.biomedcentral.com/collections/GCIR>

Generalizing and Context in Implementation Research: Tensions and Opportunities

Edited by:

Whitney Irie, PhD, *Boston College School of Social Work, USA*

Aaloke Mody, MD, *Washington University School of Medicine, USA*

Radhika Sundararajan, MD, PhD, *Weill Cornell Medicine Department of Emergency
Medicine & Center for Global Health, USA*

Submission Status: Open | Submission Deadline: 1 August 2024

Implementation Science and *Implementation Science Communications* are calling for submissions to our Collection on Generalizing and Context in Implementation Research: Tensions and Opportunities.

“How does implementation science reconcile its pursuit of scientific legitimacy and generalizing while maintaining its commitment to understanding what works, for whom, and under what circumstances — when these circumstances vary?”

About the collection: <https://www.biomedcentral.com/collections/GCIR>

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Examples of Implementation Research Questions

What are potential barriers and facilitators to the adoption of evidence-based medicine focused computerized clinical decision support systems linked to EHRs in specialty hospitals? (*Determinants*)

Moja, L, Liberati, EG, Galuppo, L, *et al.* Barriers and facilitators to the uptake of computerized clinical decision support systems in specialty hospitals: protocol for a qualitative cross-sectional study. *Implementation Sci* **9**, 105 (2014). <https://doi.org/10.1186/s13012-014-0105-0>

Is BASIS-T more effective than the ACC condition in promoting implementation outcomes (adoption, reach, fidelity, and sustainment)? (*Process/Evaluation*)

Lyon, AR, Cook, CR, Larson, M, *et al.* Protocol for a hybrid type 3 effectiveness-implementation trial of a pragmatic individual-level implementation strategy for supporting school-based prevention programming. *Implementation Sci* **19**, 2 (2024). <https://doi.org/10.1186/s13012-023-01330-y>

What is the impact of the de-implementation strategies on the rate of unnecessary postoperative antibiotic prophylaxis and on key clinical outcomes?

Malone, S, McKay, VR, Krucylak, C, *et al.* A cluster randomized stepped-wedge trial to de-implement unnecessary post-operative antibiotics in children: the optimizing perioperative antibiotic in children (OPerAtiC) trial. *Implementation Sci* **16**, 29 (2021). <https://doi.org/10.1186/s13012-021-01096-1>



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Learning Opportunities

Fundamentals Series

Monthly on the 2nd Tuesday

12:00-1:00 PM

Virtual



Works in Progress Series

Monthly on the 4th Tuesday

12:00-1:00 PM

In Person & Virtual



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Fundamentals

2024 Implementation Science Seminar Series



Hosted by:

Jeremiah Brown, PhD, DCIS Director
Kelly Aschbrenner, PhD, DCIS Co-Director
Sarah Lord, PhD, DCIS Co-Director

Monthly on the 2nd Tuesday*

(*Note: 4th Tuesday for April only)

March

***From Concept to Impact:
Exploring Implementation
Models and Frameworks***

Sara Malone, PhD
Washington University

Tuesday, March 12

April

***Measuring Context, Process
and Implementation***

Katie Rendle, PhD
University of Pennsylvania

Tuesday, April 23*

May

***Implementation Frameworks:
PRISM & RE-AIM***

Tina Studts, PhD
University of Colorado
Samantha Harden, PhD
Virginia Tech

Tuesday, May 14

National Resources

- **NIH Orientation to the Science of Dissemination and Implementation:** <https://cancercontrol.cancer.gov/is/training-education/orientation-to-the-science-of-dissemination-and-implementation>
- **Interactive webtool for selecting implementation TMFs:** <https://dissemination-implementation.org/about-us/>
- **EPIS Framework website:** <https://episframework.com>
- **RE-AIM website:** <https://re-aim.org>
- **CDIAS and PSMG Virtual Grand Rounds:** <https://www.c-dias.org/educational-programs/c-dias-psmg-virtual-grand-rounds/>
- **UT Health Houston Seminar Series:** <https://www.uth.edu/implementation-science/our-work/training/annual-workshop>

Discussion



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